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EXAMINER

PILKINGTON, JAMES

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 5/13/05 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 19-26, 28, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan, USP 2,756,609, in view of Brusasco, USP 4,138,902.

Hogan discloses an actuator comprising:

- An outer tubular body (34)
- An inner tubular body (21/22) having a portion positioned inside said outer tubular body (34)
- a nut assembly (between 31 and 32) inter connected to said inner tubular body (21/22), said nut assembly (between 31 and 32) having at least one helical ball race (opposing faces 36 make race) having a helical portion extending circumferentially for less than 360 degrees around said nut

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assembly (length of 36 connecting the two ends of 39), said helical ball race (36) having a widened portion (at 39) connecting to a first end and a second end of said helical portion (36)

- a plurality of balls (38) received between the helical ball race (36) and an inner surface of said tubular body (34)
- said widened portion (39) defining a re-circulation zone for the balls (38) arranged between the ball-race and the inner surface of the tubular body (34)
- a driving means (20/21) cooperative with said nut assembly (between 31 and 32) for rotating the nut, in order to ensure the displacement in translation of the tubular body (34) with respect to the nut the inner face of the first tubular body comprises helical ball-races for guiding the balls
- wherein said nut comprises a plurality ball races (one between each disk 28), each of the ball-races having a re-circulation zone (39) for the balls e re-circulation zones for the balls are not aligned in a direction of translation of the actuator (the mating re-circulation zone of the next disk is offset and therefore not aligned in a direction of translation)
- wherein the ball- races are so arranged that the re-circulation zones (39) are regularly angularly distributed about the direction of translation of the actuator (since the re-circulation zones are not in a line they are regularly angularly distributed in so much as there angular pattern/location is predictable, see Figure 2)

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- wherein said nut comprises a plurality aligned elements (each disk 28) each of a cylindrical shape (see Figure 7), each of said plurality of aligned elements (28) having at least one bevel (36) defining a helical cam surface, the helical cam surface (36) of one of said plurality of aligned elements defining the helical ball race with the helical cam surface of another of the plurality of aligned elements
- wherein the ends of each helical cam surface (36) defines a setback (at 39), a pair of aligned elements (28) being positioned with respect to each other such that the setbacks (39) are facing each other, said setbacks (39) defining the re-circulation zone for the balls (38) (see Figure 2)
- wherein said plurality of aligned elements (28) are tightenable with respect to each other (clamped together by spring 33 and nut 24)
- a nut member (24) cooperative with said plurality of aligned elements (28) so as to adjust the tightening of the elements (28)
- each of said plurality of aligned elements (28) having a cross-section with a beveled circular edge (36), the helical cam surface being inclined relative to an axis of said cylindrical shape, the helical cam surface having ends connected by a setback (39) surface of a generally conical shape
- wherein the helical ball races in the inner surface of the outer tubular body (34) are formed by plastic distortion of said plurality of balls (balls press against inner side of outer tube)

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Hogan does not disclose that the first tubular body comprises a helical ball race which is substantially equal to the helical pitch of a ball race of the nut.

Brusasco teaches a first tubular body (15) that comprises a helical ball race (for balls 4) which is substantially equal to the helical pitch of a ball race of the nut for the purpose of assuring the pitch movement of the balls and the moving body are correct (C1/L48-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan and provide the first tubular body with a helical ball race which is substantially equal helical pitch of a ball race of the nut, as taught by Brusasco, for the purpose of assuring the pitch movement of the balls and moving body are correct.

4. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902.

Hogan in view of Brusasco discloses all of the claimed subject matter as applied above. Hogan further discloses the use of a spring (33).

Hogan in view of Brusasco does not disclose that the spring is between the nut and the aligned elements.

It would have been obvious to one having ordinary skill in the art to arrange the spring between the nut and the aligned elements since rearranging the location of the spring would have been obvious to try and would still yield the predictable result of subjecting the balls to a radial thrust against the outer tube (c2/l64-70). If the spring is

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located at the end of the nut assembly or between the nut and the aligned elements in Hogan the function of the spring does not change.

5. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 and further in view of Barrett, USP 2,299,785.

Hogan and Brusasco disclose all of the claimed subject matter as disclosed above. Hogan further discloses that the drive means is a motor (20).

Hogan and Brusasco do not disclose that the motor is mounted fixed inside a second tubular body being drivable in translation with respect to the first tubular body.

Barrett teaches a motor (20) that is mounted fixed inside a second tubular body (11) being drivable in translation with respect to the first tubular body (17) for the purpose of providing an actuator that has a low manufacturing cost, simply construction and an extremely low capacity coupling with ground with a high leakage resistance to ground (C1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and provide a motor that is fixed inside a second tubular body being drivable in translation with respect to the first tubular body, as taught by Brusasco, for the purpose of providing an actuator that has a low manufacturing cost, simply construction and an extremely low capacity coupling with ground with a high leakage resistance to ground.

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6. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 and further in view of Gould, USP 2,936,646.

Hogan and Brusasco disclose all of the claimed subject matter as disclosed above.

Hogan and Brusasco do not disclose that the ball-races of the inner surface of the outer tubular body are comprised of at least one wire positioned in the shape of a spiral inside the first tubular body.

Gould teaches a ball-race formed on the inner surface of a tubular body (42) comprising at least one wire (38) positioned in the shape of a spiral inside of the outer tubular body (42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan and Brusasco and provide a ball-race formed on the inner surface of a tubular body comprising at least one wire positioned in the shape of a spiral inside of the outer tubular body to yield the predictable result of providing a groove for the balls that is cheaper to manufacture but still supports and moves the balls at an even pitch.

7. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 and Gould '646 and further in view of Devenyi, USP 5.636.549.

Hogan in view of Brusasco and Gould discloses all of the claimed subject matter as disclosed above.

Hogan in view of Brusasco and Gould does not disclose that the wire thread comprises a first wire positioned in the shape of a spiral inside the outer tubular body, on which the balls rest and a second intercalated wire having a diameter smaller than that of the first wire and extending between the windings of the first wire.

Devenyi teaches a spiral thread comprising a first wire (16) positioned in the shape of a spiral and a second intercalated wire (17) having a diameter smaller than that of the first wire and extending between the windings of the first for the purpose of maintaining a space and the correct pitch between the first wire (C2-C3/L66-12).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and Gould and provide a first wire and a second intercalated wire between the windings of the first, as taught by Devenyi, for the purpose of maintaining a space and the correct pitch between the first wire.

8. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 further in view of Halasy-Wimmer, US PGPub 2004/0093973.

Hogan in view of Brusasco discloses all of the claimed subject matter as disclosed above.

Hogan in view of Brusasco does not disclose an interior tube within the outer tubular body, the interior tube comprising the ball-races.

Halasy-Wimmer teaches an interior tube (8) arranged in the tubular body (9), the interior tube (8) comprises the ball-races for the purpose of providing a device with a considerable reduction in manufacturing costs due to non-cutting fabrication (paragraph 0004).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and provide an interior tube arranged in the outer tubular body, the interior tube comprising the ball-races, as taught by Halasy-Wimmer, for the purpose of providing a device with a considerable reduction in manufacturing costs due to non-cutting fabrication.

9. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 further in view of Yapple, USP 5,358,265.

Hogan in view of Brusasco discloses all of the claimed subject matter as disclosed above.

Hogan in view of Brusasco does not disclose another tubular body, the outer tubular body being connected to another nut, rotation of the another nut causing the displacement in the translation of the another body with respect to the outer tubular body.

Yapple teaches a multiple tube system comprising an additional tubular body (16c), a first tubular body (16b) being connected to a second nut (72 on 16c), rotation of the second nut causing displacement in the translation of the additional body (16c) for

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the purpose of providing an actuator comprising at least three telescoping members which allows for additional length of actuation (C4/L1-33).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and provide another tubular body, the outer tubular body being connected to another nut, rotation of the another nut causing the displacement in the translation of the another body with respect to the outer tubular body, as taught by Yapple, for the purpose of providing a device with a considerable reduction in manufacturing costs due to non-cutting fabrication.

10. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 further in view of Laskey, USP 6,101,889.

Hogan in view of Brusasco discloses all of the claimed subject matter as disclosed above.

Hogan in view of Brusasco does not disclose that the outer tubular body is made of aluminum, KEVLAR, carbon fibers or molded plastic.

Laskey teaches a tubular body made of aluminum (C3/L8-19) for the purpose of providing a material suitable for the load.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and provide for the outer tubular member being made out of aluminum, as taught by Laskey, for the purpose of providing a material suitable for the load being handled.

Response to Arguments

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11. Applicant's arguments filed 7/23/08 have been fully considered but they are not persuasive.

12. The Applicant argues that Hogan does not describe a nut including "helical ball races."

Hogan does indeed disclose helical races in the nut assembly (structure between 31 and 32). In fact Hogan states in C2/L47-48 that "inclined opposed edges 36 of each adjacent disk define together a v-shaped helical track".

13. The Applicant argues that Hogan does show a "ball recirculation zone."

Hogan does indeed disclose ball recirculation zones. Hogan states that character 39 is "a cross over passageway taking the form a helix extending in the opposite direction of the helix of track 37 [opposing faces 36]" (C2/L55-59). A cross over passageway is indeed a recirculation zone as claimed.

14. The Applicant argues that Hogan does not disclose that the outer tube does not have helical races.

Claim 19 does not define the structure of the helical races and as broadly defined Hogan discloses the same helical race as claimed in claim 31 "formed by plastic distortion by said plurality of balls" since the balls in Hogan would cause some deformation in the walls out of the tube member. For the particular structure of the helical races the relies on Brusasco.

15. The Applicant argues that one of ordinary skill in the art would not combine Hogan and Brusasco because Brusasco discloses an arrangement that allows for varying pitch.

Brusasco is being used to teach that the pitch of the helical groove can be substantially equal to that of the nut since Hogan does not disclose a set pitch in the groove created by the plastic deformation between the inner wall and the balls. The fact that the pitch in Brusasco varies would not stop one with ordinary skill in the art from making grooves in the outer member of Hogan that match the pitch of the nut at any given location along the axial length.

16. The Applicant argues that Hogan teaches away from using a groove on the inside of the outer tube.

The Examiner disagrees. Hogan teaches an arrangement where the balls of the device are subjected to a radial load which presses the balls against the inner wall of the outer tube. This pressing causes a plastic deformation in the wall of the tube which creates a helical groove, although this groove may be small it is still a helical groove which is formed in the same manner as that claimed in claim 31 of the instant application.

17. The Applicant contests that the instant application is simplified over that taught by the combination of Hogan and Brusasco.

A device being simplified does not determine patentability over the prior art. Patentability is determined the prior art and the structure defined by the claims of the instant application. The claims of the instant application do not structurally define over the prior art as applied above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection (claim 27, old claim 9) presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES PILKINGTON whose telephone number is (571)272-5052. The examiner can normally be reached on Monday-Friday 8:00AM-4:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. P./
Examiner, Art Unit 3682
9/24/08

/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3682